Q7. What signal form is anticipated for contribution circuits for production? Are different quality levels provided? Have you considered both satellite and terrestrial common carrier delivery? Assuming the production processes listed in 4 above, how many times through the signal form can an image go while retaining acceptable production quality in the resulting picture? Have you tested this experimentally?

NHK

1. Digitally compressed SMPTE 240M will be used for contribution. Two quality levels will require 60 Mb/s and 120 Mb/s, respectively. These bit rates can provide signal quality sufficient for post-production purposes.

2. For the 60 Mb/s signal, two concatenations of coding/decoding are possible. For the 120 Mb/s signal, more than five concatenations of coding/decoding are possible.

3. Lower bit rates might be possible for lower performance sources. Lower performance sources are not recommended, however, for the reasons given in the answer to B.2.

GI

1. Use of higher rate transmission is recommended for contribution circuits for production, as discussed in the answers to 3-5 above.

Zenith/ATT

1. Modest compression in two dimensions (no motion compensation) will provide very good quality for cutting, keying, and image manipulation.

2. Two-dimensional compression of DSC-HDTV in the order of 200 MHz is being actively pursued. Results are not yet ready for publication.

3. See the answers to B.2-B.5 above for more information.

ATRC

1. Contribution signals are expected to be MPEG compressed video at data rates appropriate for satellite and terrestrial circuits. Contribution and distribution will most likely differ in the amount and type of compression/decompression, e.g. motion-compensated *vs.* spatial. (See also answer to Question 3.) Contribution standards should be carefully related to the terrestrial simulcast standard just as in the case of distribution standards.

2. There are many possibilities that have cost/performance tradeoffs. Decisions on these issues should be made by the industry.

MIT

1. Contribution circuits may use same signal format as broadcast link. Higher data rate is useful if signal is to be further processed. Other signal formats also acceptable. Production quality after multiple encode/decode passes not tested but expected to depend strongly on data rate used. See also answer to B.3.

Cable

Q1. What provisions are made for conditional access without decoding the signal? Is partial decoding required? How complex is the equipment required to accomplish these functions?

NHK

1. The conditional access planned is the same as developed for fullband MUSE. This combines line rotation and line permutation. It is described in the Narrow MUSE System Description document.

2. There is no need to decode the video signal to recover the key information, but the digital data during the vertical blanking interval must be decoded.

3. Equipment complexity for N-MUSE is the same as for fullband MUSE, where an encoder takes one rack with three shelves and a decoder currently uses six chips in addition the N-MUSE encoder and decoder hardware. This will be reduced in commercial equipment because current equipment is prototype hardware.

GI

1. Protocol designed to support conditional access without decoding. Cable headend could insert or delete authorization information without decoding signal.

2. Equipment needed is not complex and can be done either at a source or downstream. Scrambling can be done by bit-by-bit Exclusive OR'ing with a pseudo-random data stream. Channel synchronization and data stripping can be done while maintaining the picture in a scrambled mode.

Zenith/ATT

1. Conditional access, i.e. insertion and capture of address/enable instructions, can be accomplished without decompressing the fully compressed 21.5 Mb/s signal. Channel synchronization, clocks, and general timing information are neither video encoded nor encrypted when the program is encrypted.

2. Encryption of the program can take many forms, one of which is the stream-cipher process contemplated. This process adds a known (but secret) pseudo-random number series to the message (program) data stream. Decrypting is the complementary process.

3. With key passing and addressing accommodated with the ancillary data channel, either encrypting or decrypting can be carried out any any point, origination or downstream, with simple equipment and without decompressing the 21.5 Mb/s (or any other) signal.

ATRC

1. Conditional access data can be decoded without decoding video and audio. It can be treated as a separate service type or included with the video/audio data.

2. Receivers can be built to decode only conditional access data and then to decode video and audio only after receiving authorization.

3. Digital encryption can be performed at any downstream point. AD-HDTV offers several layers at which encryption may be applied.

MIT

1. Decoding not required for conditional access data (or for Auxiliary data or Audio data). Such operations are very simple, given the digital time-division-multiplexed nature of the signal.

2. The scrambling operation is straightforward. It can be done at the source or downstream. Channel synchronization and data stripping can be accomplished with a scrambled picture.

Q2. See questions 3, 4, 5 & 6 under Broadcast above.

NHK

1. See answers to 3-6 under Broadcast.

GI

1. See answers to 3-6 under Broadcast.

Zenith/ATT

1. See answers to 3-6 under Broadcast.

ATRC

1. Signal distribution to most headends is anticipated to be in final compressed form, requiring on the order of 20 Mb/s, which is easily achieved on a satellite using QPSK.

2. The layered architecture of AD-HDTV allows headends to decode QPSK symbols into a serial data stream and then encode the bits either as SS-QAM or conventional QAM in a 6 MHz channel.

3. Local commercial insertion may be accomplished simply and economically by taking advantage of the spatially-coded frames that occur on a periodic basis in MPEG compression. This allows artifact-free cuts to be made on Group of Pictures (GOP) boundaries, even in the highly-compressed transmission format.

MIT

1. See answers to 3-6 under Broadcast.

Common Carrier

Q1. What form of signal do you propose for transmission over terrestrial common carrier links?

NHK

1. There will be two signal formats, with three quality levels total:

   - Compressed SMPTE 240M with 120 Mb/s for contribution
   - Compressed SMPTE 240M with 60 Mb/s for distribution
   - Digitally compressed Narrow MUSE at 40 Mb/s, reduced from the normal 78 Mb/s of digital N-MUSE

GI

1. The DigiCipher HDTV signal is packetized and can be transmitted along with other forms of data over common carrier links such as fiber or microwave.

Zenith/ATT

1. See Broadcast section, Question 3.

ATRC

1. Transmission is expected within the B-ISDN/ATM framework is expected. The 148 byte data cells of AD-HDTV can be repackaged into ATM's 53 byte data cells. The AD-HDTV layered architecture allows the repackaging to be completely transparent to higher layers, namely, video and audio compression.

2. The data structures are applicable at any data rate from the fully compressed 20 Mb/s signal to the high performance, lower-compression signals.

MIT

1. The (compressed) baseband digital signal can be easily multiplexed onto common carrier links. The baseband digital signal is 26.43 Mb/s for 32-QAM operation.

Q2. Are the SONET bit rates assumed the correct choices?

NHK

1. The SONET bit rate choice of 360 Mb/s is correct for N-MUSE. This value permits multiples of the digitally compressed SMPTE 240M signals (both at 60 Mb/s and at 120 Mb/s) and of the digitally compressed Narrow MUSE to fit well in a single SONET channel.

GI

1. SONET data rates are high enough but have not been specifically studied.

Zenith/ATT

1. Two DSC-HDTV fully compressed 21.5 Mb/s data streams can be accommodated within the basic SONET modular data rate of 51.84 Mb/s.

2. For the 100 Mb/s 2D compressed format, a SONET STS-2 rate of 103.68 Mb/s can be used.

3. For the 200 Mb/s 2D compressed format, a SONET STS-4 rate of 207.36 Mb/s can be used.

ATRC

1. Any data rate on the order of 20 Mb/s is sufficient. This assumes that, particularly during the transition period, distribution will most frequently be at the level of compression used for transmission and that local affiliates/headends will perform minimal decompression and processing of the signal.

MIT

1. Bit rate depends on the application and quality desired. Any of the digital hierarchies supplies rates that seem to be appropriate.

Q3. What bit error rates does your proposed distribution format require of the transport system? Your production contribution format?

NHK

1. Lower than 10^{-6}.

GI

1. The issue is not what error rates are objectively required but what can be tolerated subjectively. Uncorrected errors introduced in distribution or contribution channels should be reduced to the minimum cost effectively achievable.

2. Suggested minimum requirement of less than one uncorrectable error per 10 minutes for distribution and less than one per hour for contribution, corresponding to raw error rates of 1.7×10^{-2} and 1.4×10^{-2}, respectively.

Zenith/ATT

1. A BER of 10^{-4} is satisfactory for both distribution and contribution.

ATRC

1. BER requirements for distribution and contribution will depend on the amount of compression that is used and the error handling capabilities that are designed into them.

2. Ad-HDTV has been carefully designed to tolerate packet error rates on the order of 10^{-3}. BER requirements for distribution and contribution must be significantly lower. Very conservative BER requirements are generally planned in the specification of digital links.

MIT

1. Operates over wide range. "Transparent" error rates might be 10^{-9} for distribution and 10^{-11} for production at the output of the Reed-Solomon decoder, although much higher error rates can be tolerated. If the system carried the same amount of data without error correction, the BER would have been approximately 10^{-2}.

Consumer

Q1. What is required in a consumer VCR for the system? When will such a VCR be available? Is new technology required first? What format is to be recorded? Are any current VCR features not possible with this format? Have you verified this experimentally?

NHK

1. For an analog VCR, no new technology must be developed because the bandwidth of N-MUSE is the same as that of NTSC. A consumer VCR will become available within two years after the FCC decision.

2. Narrow MUSE can be recorded using FM, as with NTSC. The sync circuit in the current VCR design must be modified. Chroma circuitry can be removed. A time base corrector is required.

3. Technology for a 40 Mb/s consumer VCR capable of two hours of digital recording is already available. A digital consumer VCR will become available within two years of the FCC decision.

4. The distinction of moving and stationary areas, as provided by the use of the motion vector, is essential to obtain the full capability of N-MUSE. Whether or not an N-MUSE decoder can perform these functions in VCR stunt modes depends on the decoder design. With proper decoder design, the N-MUSE signal can be fully decoded in slow, still, and reverse motion.

GI

1. A consumer VCR for DigiCipher HDTV has been demonstrated recording and playing back the 18.22 Mb/s of a fully-compressed DigiCipher HDTV signal. Implementation of current VCR playback features has been studied, and it is believed that a full set can be implemented. This has been substantiated through simulation.

2. Speed search functions will utilize PCM (intraframe) refresh data, which is used to continuously refresh one-eleventh of the picture each frame and thus the whole picture every 11 frames. There are no restrictions on speeds caused by the technique.

Zenith/ATT

1. The level of mechanical and electronic technology of current full-featured S-VHS VCR's will be appropriate for the fully-compressed DSC-HDTV signal at 21.5 Mb/s.

2. Consumer grade VCR's will be available at about the same time as DSC-HDTV receivers.

3. Most features are possible. Speed search simulations have yielded satisfactory results.

ATRC

1. Consumer VCR's require tradeoffs between compression format and data rate. The lowest cost VCR would directly record the transmitted data in compressed form. No new head/tape technology will be required for such a recorder.

2. The periodically occurring, spatially coded frames of MPEG compression provide advantages in achieving features such as search modes. These capabilities have not been demonstrated in experimental hardware.

3. All features are expected to be available in top-of-the-line models. Low cost models may have fewer features. The frame-based compression in AD-HDTV has no significant impact on search mode performance, but it does permit full-resolution stills to be presented in freeze-frame mode.

MIT

1. The signal may be directly recorded in digital format. Current VTR features possible, but very flexible control (i.e. arbitrary-rate, undegraded fast-forward and rewind) may require higher data rate and less recursive format.

2. Rewind search operations will utilize the intra-frame encoding mode. One twentieth of each frame is refreshed continuously, thereby encoding three frames/second using the intra-frame mode. These frames can be used for rewind search mode.

Satellite

Q1. Is it possible to carry the ATV signal and an NTSC signal on the same transponder? If so, at what bandwidth? What other multiples are possible with your system?

NHK

1. Required quality level determines the bandwidth needed for simultaneous transmission of ATV and NTSC signals. When the signal formats described in answer to Common Carrier Question 1 are used for satellite transmission, the bit rates and bandwidths for QPSK operation are as shown in the following table:

ATV	NTSC	Total bit rate	Bandwidth
40 Mb/s	17 Mb/s	57 Mb/s	34 MHz
60 Mb/s	17 Mb/s	77 Mb/s	46 Mb/s
120 Mb/s	34 Mb/s	144 Mb/s	92 Mb/s

   8ϕ PSK can also be used.

2. Narrow MUSE can also be transmitted using conventional FM modulation. In such a case, 45 MHz is required to transmit both N-MUSE and NTSC as described in the answer to Question 5 in the Broadcast section above.

GI

1. It is possible. One HDTV and two NTSC signals can be carried within 24 MHz using QPSK.

Zenith/ATT

1. See Broadcast section, Question 6.

ATRC

1. Analog satellite links can use an FDM arrangement of AD-HDTV on a QPSK carrier, occupying 6 MHz at baseband, with NTSC on an FM carrier. FDM could be performed at either RF or IF. This could be accomplished using standard transponders, with a lower modulation index for NTSC. This would lower the CNR threshold for NTSC.

2. With digital satellite links providing about 60 Mb/s, a TDM mix of AD-HDTV and/or compressed digital NTSC can be carried. Three AD-HDTV channels can also be carried in a single transponder. C-band (K-band) satellites can deliver 60 Mb/s using a 36 MHz (54 MHz) transponder with QPSK modulation.

MIT

1. Transponder bandwidths are typically between 36 and 72 MHz. FDM can be used to carry both ATV and NTSC signals. TDM can also be used to carry ATV and digital NTSC signals. The CCDC HDTV signal would require 12 MHz bandwidth using QPSK modulation (8PSK trellis coded). A single transponder can easily carry several CCDC-HDTV signals.

Q2. See questions 3 & 7 under Broadcast above.

NHK

1. See the answers to 3 and 7 under Broadcast.

GI

1. See the answers to 3 and 7 under Broadcast.

Zenith/ATT

1. See the answers to 3 and 7 under Broadcast.

ATRC

1. See the answers to 3 and 7 under Broadcast.

MIT

1. See the answers to 3 and 7 under Broadcast.

DRAFT

Capital and Expense Budget for HDTV Single Transmitter vs. Multiple Transmitters

Capital Expense

	Single Transmitter (existing tower)			Single Transmitter (new tower)			Multiple Transmitter (rent space)			Multiple Transmitter (build towers)		
	Qty.	Each	Total	Qty.	Each	Total	Qty.	Each		Qty.	Each	Cost
Transmitter(s)	1	$500,000.00	$500,000.00	1	$500,000.00	$500,000.00	8	$60,000.00	$480,000.00	8	$60,000.00	$480,000.00
Tower(s)		$0.00	$0.00	1	$800,000.00	$800,000.00			$0.00	8	$30,000.00	$240,000.00
Transmission Line	1500	$100.00	$150,000.00	1500	$100.00	$150,000.00	1600	$10.00	$16,000.00	1600	$10.00	$16,000.00
Antenna(s)	1	$250,000.00	$250,000.00	1	$250,000.00	$250,000.00	8	$20,000.00	$160,000.00	8	$20,000.00	$160,000.00
Land		$0.00	$0.00	25	$10,000.00	$250,000.00	8	$6,000.00	$48,000.00	8	$6,000.00	$48,000.00
Building		$0.00	$0.00	1	$30,000.00	$30,000.00	8	$10,000.00	$80,000.00	8	$10,000.00	$80,000.00
Terminal Equipment		$40,000.00	$40,000.00		$40,000.00	$40,000.00	8	$20,000.00	$160,000.00	8	$20,000.00	$160,000.00
Intercity Relay	1	$125,000.00	$125,000.00	1	$125,000.00	$125,000.00	0		$0.00	0		$0.00
Fiber Interconnect		$0.00	$0.00		$0.00	$0.00	8	$15,000.00	$120,000.00	8	$15,000.00	$120,000.00
Digital Interface and Delay		$0.00	$0.00		$0.00	$0.00	8	$10,000.00	$80,000.00	8	$10,000.00	$80,000.00
Test Equipment		$100,000.00	$100,000.00		$100,000.00	$100,000.00		$100,000.00	$100,000.00		$100,000.00	$100,000.00
Remote Control and Monitoring		$18,000.00	$18,000.00		$18,000.00	$18,000.00	8	$6,000.00	$48,000.00	8	$6,000.00	$48,000.00
Total			$1,183,000.00			$2,263,000.00			$1,292,000.00			$1,532,000.00

Monthly Operating Expense

distribution to sites

Tower Rental		$0.00	$0.00		$0.00	$0.00	8	$1,500.00	$12,000.00		$0.00	$0.00
Leased Fiber		$0.00	$0.00		$0.00	$0.00	240	$350.00	$84,000.00	240	$350.00	$84,000.00
Power	180000	$0.05	$9,000.00	180000	$0.05	$9,000.00	48000	$0.05	$2,400.00	48000	$0.05	$2,400.00
Additional Site Maintenance		$500.00	$500.00	1	$2,000.00	$2,000.00			$0.00	8	$250.00	$2,000.00
Maintenance Expense (Parts)		$830.00	$830.00		$830.00	$830.00	8	$200.00	$1,600.00	8	$200.00	$1,600.00
Maintenance Expense (Personnel)		$0.00	$0.00	1	$2,920.00	$2,920.00	1	$2,929.00	$2,929.00	1	$2,920.00	$2,920.00
Total Monthly Expense			$10,330.00			$14,750.00			$102,929.00			$92,920.00
Total Annualized Expense			$123,960.00			$177,000.00			$1,235,148.00			$1,115,040.00

DF/SMW 7/21/92

Assumptions made within Capital and Expense Budget for HDTV
Single Transmitter vs. Multiple Transmitter

Single Transmitter Scenario-

Transmitter - 30KW to 40KW uhf, no combining, harmonic filter only.
Tower - 1500 ft, 8ft face, no elevator , wide spaed guying
Transmission Line - 1500 ft. @ $100/ft installed
Antenna - Omni UHF traveling wave type 50 KW max at flange
Land - 25 Acres (min for 1500ft tower) @ $10,000 /acre
Building - Concrete block building/ air cond with min upgrades
Terminal Equipment - Internal digital distribution and transcoding
Intercity Relay - 6 Ghz fully redunant (hot standby 1W) with 2 -10ft dishes capable of QPSK
Test Equipment - Spectrum analyzer, HDTV B.E.R. set, Digital scope, HDTV Test Gen.
Remote Control and Monitoring - Moseley Style 32 telemetry,control, status

Multiple Transmitter Scenario-

Transmitters - 100W - 250W uhf,per loc, no combining, harmonic filter only.
Tower - 150 ft, self supporting tower (similar to cellular radio)
Transmission Line - 200 ft. @ $10/ft installed per loc.
Antenna - Omni UHF whip style per loc, 1 KW max at flange
Land - <1 Acres (min for 150ft tower) @ $6,000 per loc.
Building - Prefab Concrete / air cond with min upgrades per loc.
Terminal Equipment - Internal digital distribution and transcoding
Fiber Interconnect - Multimode fiber digital interface
Digital Interface and Delay - Fiber digital transmission mode conversion and location delay per loc.
Test equipment - As above shared with all locations
Remote Control and Monitoring - Multisite Moseley style 16 tele,cont,stat per loc.
Test Equipment - Spectrum analyzer, HDTV B.E.R. set, Digital scope, HDTV Test Generator
Remote Control and Monitoring - Moseley Style 32 telemetry,control, status

Expense Assumptions-

Tower Rental - $1500 per month per loc. for 16 ft whip style antenna.
Leased Fiber - "dark fiber" $350/mile 30 miles assumed via hub
Power - 180kW/hr @ $.05 for high power xmtr- 48 kW/hr @ $.05 for mult.
Additional Site Maint - Incremental increase due to additional transmitting antenna on tower or additional tower site to manage (tower maint, lawn mowing etc.)
Maintenance (Parts) - Tubes etc. based on experience
Maintenance (Personnel) - With transmitter on existing tower no additional personnel necess., With additional sites one additional person rec. @ $35,000/ann.

DEPARTMENT OF ELECTRICAL ENGINEERING AND COMPUTER SCIENCE

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

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July 10, 1992

Craig K. Tanner, Chairman
Working Party 6 of the
Planning Subcommittee of the
FCC Advisory Committee
c/o Cable Television Laboratories, Inc.
1050 Walnut Street, Suite 500
Boulder, CO 80302

Dear Craig,

Some preliminary thoughts on the drafting and maintenance of HDTV standards.

Suppose the FCC chooses a particular proponent system as the basis for a standard. In my opinion, the winning system proponent has to take the leadership role and be given a considerable amount of authority in drafting the standard, with other parties playing a support role. If the job is left to a committee that consists of parties with differing interests, it could cause substantial delay in drafting the document.

The winning proponent should be given reasonable incentives to get the draft done as quickly as possible. If the winning proponent is forced to provide without adequate compensation the technical know-how which is very useful for manufacturers, but is not essential to use the standard, there will be considerable resistance from the winning proponent.

In short, the winning system proponent should be given considerable authority to write the standard and should also be given incentives to complete the standard draft as soon as possible.

Sincerely,

Jae S. Lim
Professor of Electrical Engineering
Director of Advanced Television
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July 7, 1992

Craig Tanner
Co-Chairman, IS/WP-2
c/o CableLabs
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FAX AND MAIL

Dear Craig:

At the June 24 meeting of IS/WP-2 you requested comments on issues involving the drafting and maintenance of HDTV standards. This letter responds to that request.

The matter is complex and challenging, and has not yet been addressed in depth. It is very useful that some planning be done, to think out potential problems and solutions ahead of time, so that the actual execution is less thorny.

My thoughts:

- One starts with what is the purpose of the various standards? Answers include providing information for use in a regulatory-enforcement sense to ensure compliance, information to assist someone who wishes to practice and comply with the standard, and information for someone understanding who wishes to understand the standard. The needs for different users are not necessarily the same.

- In developing the standards there must be a tradeoff between timeliness and perfection. Standards writing can be quite bureaucratic, and time consuming. But, standards writing should not block/delay implementation of HDTV service. Some compromises are in order.

- Assume that the standards writing should be a multipass effort, with a first, rapid execution followed by later refining edits. That is, get something published relatively quickly, and refine it over time.

- Assume that the winning proponent shares information with manufacturers in parallel with standards writing, and don't allow the standards writing phase to impede such communication.

- Implement a small team approach to generating the standards, with the proponent plus a few "helpers" designated to produce a first draft for review by a larger group.

- Assume that the proponent and manufacturers are economically motivated to cooperate and are of good will, and will cooperate. Play a referee role, realizing that there is likely to be plenty of feedback, and at least some griping.

- It is not yet clear exactly what needs to be in the various standards. It appears that the FCC would like to be somewhat general, referring to another document, e.g., an ATSC standard, for details. How to divide between the two is an issue to be resolved.

- How to describe that which is being standardized is an issue. It will be inadequate to only describe the transmitted signal. There will also probably need to be discussion of the algorithm used to generate the data stream, or an algorithm necessary to receive it.

- Algorithmically, does there need to be a minimum performance specification on either the encoder or decoder side in order to comply? Are there then optional features which must be described in the standards?

- Should the standard(s) leave the door open to extensions, allowing them to occur without further modification of the standard(s)?

- Recognize that the technology, the system and the standards will evolve over time, and that there must be a review and maintenance mechanism which can support that evolution. That seems to be an issue with respect to standards which would be written by the ATSC, since the ATSC is assumed to go out of existence within a year or two. Perhaps any standards written by the ATSC need to be issued by one or more of its sponsoring organizations, with maintenance over time assigned to the issuing organization.

Sincerely,

Bob Rast

Robert M. Rast
Vice President, HDTV Business Development

cc: Jerry Heller
Jeff Krauss
Jae Lim
Woo Paik
Quincy Rodgers

ZENITH

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VIA FAX

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July 8, 1992

Mr. Craig Tanner
CableLabs
1050 Walnut Street
Suite 500
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Dear Craig,

Congratulations on your new role with IS/WP-2. As always, we at Zenith (and AT&T) will do our best to diligently support the work of the Advisory Committee and all its supporting structure.

Charlie Heuer, based on discussions in Washington last week, jotted down thoughts on the "Standards Setting Process" which may be useful to you.

W. Luplow

WL/cgq/encl.

cc: C. Heuer

OBSERVATIONS ON THE STANDARDS PROCESS

The Special Panel will specify an HDTV system to be recommended to the Advisory Committee. One presumes that system will in turn be recommended to the FCC, approved and implemented in the appropriate variety of standards and specifications.

It is likely that the Special Panel output will include changes or additions mandated as part of the selection of a proponent's system. These could be

- o agreed changes suggested or required by the proponent;
- o agreed changes proposed by the Special Panel;
- o desired changes which cannot be resolved in the one-week lifetime of the Special Panel.

To the extent any changes suggest that further testing may be required, one can suggest that SS/WP-1 should make that technical determination, working with SS/WP-2, the Field Test Task Force, and the proponent.

Given a system recommendation by the Special Panel and the Advisory Committee, documentation of the system should be expedited. The convenor of standards activity should assure that the output of this activity reflects the system parameters and performance expected and agreed by the Special Panel and the chosen proponent.

It will be helpful in administering this process to distinguish between the system to be standardized and the Standards or specifications (at any level) which implement the system:

- o The system to be standardized is that chosen by the Special Panel and subject of proposed rulemaking by the FCC and of which the proponent is the principal interpreter.
- o The Broadcast Standards (and any Technical Bulletins) which implement the system must reflect the format and content required by the FCC.
- o Peripheral standards must meet the industry purposes for which they are drafted.

The technical content is primarily the domain of the proponent - the structure and language should reflect the inputs of other interested parties.

For example, the system chosen will have an accepted capability in features and performance, in compatibility with other media and applications, in capability for auxiliary services, in future flexibility, etc. The standards convenor should ensure these capabilities are retained, should ensure that the standards process does not attempt to change or inadvertently change or augment the system, and should ensure that the Standards language and structure do not unduly restrict present or future implementation within the agreed system concept.

Charles Heuer
Zenith Electronics Corp.
July 8, 1992

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Craig Tanner
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July 7, 1992

Dear Craig,

Thank you for giving me the opportunity to pass on some impressions I gained in a committee-based standards setting process in which I participated that might be of value in the upcoming ADTV standardization process.

- **The scope of the work to be done by the committee must be spelled out precisely prior to the process.** There will be a tendency by the everyone involved in this standardization process to pass on "improvements" to the overall system that must be described in the standard. Although these changes might appear to have merit they often lead to endless theoretical discussions or create delay prone testing. Also, extensive changes could also lead to litigation from the losing proponents because it might be viewed as subverting the original criteria of the selection process.

- **Strong near-full-time leadership in this effort is a must.** Also, co-chairmanship or shared committee leadership will probably lead to conflicting missions, priorities and possible disagreement. Speed and a single-minded sense of mission should be the goal.

- **Keep the committee small.** There will be an overwhelming tendency to include every special interest and field of expertise on this committee to insure that some vital area is not forgotten. Although this goal is nice in theory, it weighs down the process and only hinders its progress.

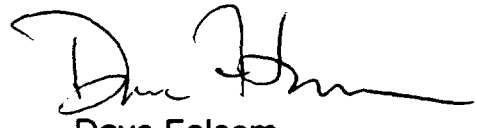
- **Make this standards committee a permanent organization.** This standard must adapt in the future to improvements and breakthroughs in technology. Built into the ADTV system concept is extensibility that must be exploited as the need and capability arises.

- **Set a timetable and keep to it.** Unfortunately, the time that it takes to complete any accomplishment is always affected by the time you are willing to spend in pursuit of that accomplishment. Fuzzy timetables coupled with a willingness to delay, will always lead to delay.

Although the principals stated above would seem to be self evident, rarely are they incorporated into a this type of standards setting organization. Political and economic self interest tend to prevail in these committees. The normally unfounded fear of offending or not including an individual's or corporation's ideas and comments in this type of process has a tendency to deflect the mission of work that needs to be accomplished. Our inbred sense of fair play sometimes stands in the way of progress. Unfortunately in this type of process, committee work too often leads to compromise and not consensus. This committee should, after all, describe technically a system that already exists and should not concern themselves in what the system could, should or might be if only...

I hope my comments are useful.

Sincerely,



Dave Folsom
Director of Engineering
WCNC-TV
Providence Journal Broadcasting

cc: Merrill Weiss

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MEMORANDUM

To: ATSC T3 Technology Group
From: Lynn Claudy, Chairman, T3/S1 Specialist Group on Macro Systems Approach
Subject: HDTV Standard Documentation for FCC Rules
Date: June 25, 1992

The ATSC Executive Committee has been examining the proper role of ATSC in the various standards efforts that will follow selection of an HDTV system by the FCC. It has been suggested that ATSC should document the terrestrial transmission standard such that it can be included in the Commission's final Report and Order on Advanced Television Service. Views on this subject were submitted to the FCC on June 5 and were distributed to ATSC members.

The task of documenting a digital HDTV standard includes issues that do not exist with analog standards such as NTSC television. Similar to NTSC, the FCC will of course require full documentation in the Rules on the RF characteristics of the system -- characteristics that would affect service and interference such as occupied bandwidth, spectral profile and transmission power requirements and limits. Unlike NTSC, receiver or receive antenna characteristics could be included if stringent standards are necessary to insure a viable HDTV service. Also unlike NTSC, source coding techniques/algorithms may need to be documented by the FCC to insure compatibility among HDTV receivers in the marketplace. Some flexibility in source decoding may be accommodated if a standard header/descriptor structure is included and this could also potentially be part of the Commission's Rules. Special services such as multiple audio channels, closed captioning and other data services may need to be addressed as well.

T3/S1 has been asked by the Executive Committee to begin the process of outlining the content of the HDTV standard, specifically documentation that will be needed for inclusion in the FCC Rules, as referenced in the ATSC's June 5 submission to the FCC. A meeting of T3/S1 will be scheduled in the near future to address these issues.

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MEMORANDUM

To: **ATSC T3/S1 (Specialist Group on Macro Systems Approach) members and other interested parties**
From: **Lynn Claudy, T3/S1 Chairman**
Subject: **Meeting Notice**
Date: **July 10, 1992**

At the June 25 meeting of the ATSC T3 Technology Group on Distribution, the attached memo was distributed and it was agreed to set up a conference call of T3/S1 to discuss the issue of documenting the HDTV standard for inclusion in the FCC Rules.

A conference call of T3/S1 will be held on Friday, July 24, 1992, at 2:00 p.m. If you or someone in your organization wishes to participate, please contact me (202-429-5340 tel. 202-775-4981 fax) or Pavanne Veltman (tel. 202-429-5346) in our office by July 22 to confirm your attendance and telephone number.

A draft agenda for the discussion is as follows:

1. Introduction and role of ATSC
2. Level of technical disclosure from proponents
3. Appropriate content for FCC standard
    a. RF spectrum issues
    b. Source coding
    c. Special services
    d. Receiving equipment
4. Other business
5. Next Meeting

Please feel free to call if you have any questions.